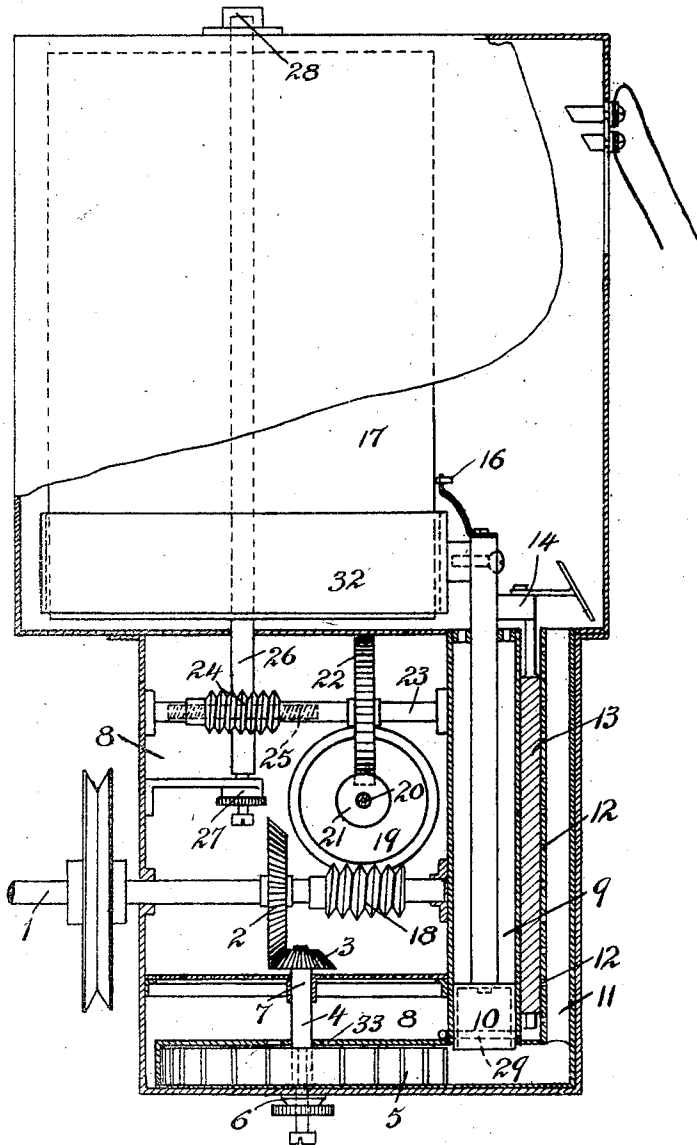


J. KRÜGER.
SPEED INDICATOR.
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1,053,045.

Patented Feb. 11, 1913.



Witnesses:

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UNITED STATES PATENT OFFICE.

JULIUS KRÜGER, OF FRIEDENAU, NEAR BERLIN, GERMANY.

SPEED-INDICATOR.

1,053,045.

Specification of Letters Patent.

Patented Feb. 11, 1913.

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To all whom it may concern:

Be it known that I, JULIUS KRÜGER, merchant, a subject of the German Emperor, residing at Friedenau, near Berlin, Germany, have invented certain new and useful Improvements in Speed-Indicators, of which the following is a specification.

My invention relates to improvements in speed indicators for motor-vehicles, in which through a rotating axle, by means of a flexible shaft, or in any other suitable manner, a centrifugal pump is actuated, whereby a liquid is forced into a cylinder, provided with a piston, which is raised thereby. The greater the speed of the driving shaft, the more liquid enters the cylinder and the piston is raised accordingly. With the piston-rod is connected a device which, by its position, indicates the speed. In the accompanying drawing my invention is illustrated in a longitudinal section in a special form of construction. A special reservoir is provided, in which the liquid is forced in the same manner, as in the cylinder with the piston. This special reservoir is provided with passages covered by a slide rigidly connected to the piston-rod so that, when the piston-rod rises, this slide successively opens the passages, so as to permit a gradually increased flowing back of the oil from the special reservoir to the pump.

The axle 4 of the centrifugal pump 5 is driven by the shaft 1 by means of beveled gears 2, 3. The shaft 1 may be driven from a main shaft in any suitable manner. The axle 4 is at one end guided in a step-bearing 6 at the other in a neck-journal-bearing 7. The liquid, preferably oil, entering the pump box 34 from the reservoir 8 by the openings 33, is thrown outward by the vanes of the centrifugal pump 5. It enters the outlet box 35 and then the cylinder 9 causing the piston 10 to ascend. Beside the cylinder 9 a second cylinder 11 of smaller diameter is arranged, into which the oil enters also and rises. The greater the pressure of the pump and the speed of the shaft 1 the greater the rise of the oil in said cylinder 11. The cylinder 11 is provided with small passages 12 arranged at intervals so that the piston 10 rises in equal distances by equal increases in speed as the bores are successively opened by a slide 13 arranged in the cylinder 11 and adapted to rise in unison with the piston 10 as it is con-

nected with the piston rod 15 of this piston by means of the cross piece 14. As soon, as the piston has reached a certain height in the cylinder, it opens the first of the passages so that a corresponding quantity of oil flows off through the same and which returns to the reservoir 8 and pump box through the pipe 29. Should the piston continue to ascend, the next passage is opened, and so on. On the top of the piston-rod 15 is arranged a spring controlled pencil 16.

The following described mechanism serves to rotate a paper drum according to the speed of the vehicle. With the shaft 1 a worm 18 is connected, which engages a worm-wheel 19. On the axle 20 of the worm-wheel 19 another worm 21 is arranged which engages a worm-wheel 22. On the axle 23 of the worm-wheel 22 is a third worm 24, which engages a worm-wheel 25. This worm-wheel 25 is fixed to the axle 26, resting on the step-bearing 27 and being journaled in the bearing 28. With the axle 26 a paper drum 17 rotates. The frame 32, connected to and rising with the rod 15, serves for making visible the speed at some distance.

The operation of the described improvements is as follows: The reservoir 8 is filled up to a certain height with a liquid, preferably oil. As soon as the shaft 1 is driven, the centrifugal pump 5 is rotated by means of the bevel-gears 2 and 3. The oil is forced into the cylinder 9 and raises the piston 10 together with the slide 13 attached to the rod 15 thereof. After the lowest passage 12 is opened a little quantity of oil is instantly allowed to flow back into the reservoir 8 so as to get a permanent circulation which is increased on the opening of the farther passages. By the ascent of the piston-rod the spring-actuated pencil 16 is likewise raised, and as the paper drum 17, against which the pencil is pressed, rotates at the same time, the pencil describes a corresponding curve on the paper drum, showing the variations of the speed.

What I claim is:

1. A speed indicator comprising a casing, a pump box arranged within said casing, a vertical axle journaled within said casing and said pump-box and suitably driven from the driving shaft of the vehicle, a centrifugal pump mounted on said axle, an outlet box connected to said pump box, a cylinder

connected to said outlet box, a piston guided in said cylinder, a chamber connected to said pump box and outlet box by suitable passages and arranged parallel to said cylinder, a liquid provided for filling the interior of said boxes and cylinder, and means connected to said piston and adapted for controlling said passages and registering the rising and falling of said piston under action of the variable pressure of said liquid generated by said centrifugal pump, substantially as set forth.

2. A speed indicator comprising a casing, a pump box arranged within said casing, a vertical axle journaled within said casing and said pump box and suitably driven by means of bevel gears and the main shaft from the driving shaft of the vehicle, a centrifugal pump mounted on said axle, an outlet box connected to said pump box, a cylinder vertically attached to said casing and

connected to said outlet box, a loose piston guided in said cylinder, a chamber arranged parallel to said cylinder and connected to said pump box as well as to said outlet box by suitable passages, a liquid provided for filling said chamber and boxes and adapted to be compressed by means of said centrifugal pump, a slide attached to said piston and guided in said chamber so as to permit a progressive opening of said passages and thereby a suitable circulation of said liquid which is increased by rising of said piston under the action of said liquid, and means for recording the movement of said piston and slide, substantially as set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

JULIUS KRÜGER.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.